

Bay Area air quality MANAGEMENT DISTRICT

Guide to Low Emission Vehicles

939 Ellis Street, San Francisco, CA 94109

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INTRODUCTION

This document is intended to assist public agencies considering the purchase of low emission vehicles for their fleets by providing information on the current availability of these vehicles, as well as funding opportunities. The document is divided into three sections: Funding, Vehicles and Fueling Infrastructure.

Over the past nine years, the Bay Area Air Quality Management District (Air District), through its Transportation Fund for Clean Air (TFCA) program, has awarded approximately \$54.5 million toward low emission vehicle projects in local public fleets. These projects are accelerating the introduction of low emission vehicles into the Bay Area. Fleet managers are becoming more interested in low emission vehicles because of the need to reduce vehicle emissions and reduce petroleum consumption and expenses.

Vehicle purchase decisions for public fleets are influenced by state and federal laws. The California Air Resources Board (CARB) continues to require cleaner cars for California, and mandates that 10% of automobiles sold in California be zero emission vehicles by the year 2003. The other 90% of new vehicles must meet increasingly stringent tailpipe emission standards. The federal government, concerned over the nation's reliance on imported oil, requires that the vehicle fleets of federal and state agencies include alternatively fueled vehicles. The Energy Policy Act of 1992 includes provisions for the U.S. Department of Energy to adopt requirements for municipal and private fleets to acquire low emission vehicles. While the schedule and details of these requirements have not yet been finalized, many fleet managers are interested in conducting demonstrations with low emission vehicles in anticipation of federal mandates and while funding sources exist to offset the incremental costs of these vehicles.

Project Development Assistance

The Air District staff listed below are available to help in the development of projects and applications for TFCA funding.

Matt Nichols	Natural Gas Vehicles	415/749-4982	Mnichols@baaqmd.gov
David Burch	Electric Vehicles	415/749-4641	Dburch@baaqmd.gov
Michael Murphy	Buses	415/749-4644	Mmurphy@baaqmd.gov

FUNDING OPPORTUNITIES

Low emission natural gas and electric vehicles typically cost more than similar gasoline or diesel vehicles. The incremental cost of the low emission vehicle varies depending upon the specific vehicle type. Natural gas and electric vehicles may also require additional expenditures in new fueling equipment. The Air District administers the following five sources of funding assistance for low emission vehicle projects:

- Regional Fund of the Transportation Fund for Clean Air (TFCA)
- Vehicle Incentive Program (VIP)
- CHARGE! Bay Area Electric Vehicle Charging Network Grant Program
- California Energy Commission's Electric Vehicle Incentive Program

- Carl Moyer Memorial Air Quality Standards Attainment Program

Regional Fund of the Transportation Fund for Clean Air (TFCA)

The Regional Fund of the TFCA provides funding to public agencies for various types of alternative fuel (CNG, propane, or electric), low emission vehicle projects:

1. Passenger cars, pick-ups, and vans with a gross vehicle weight of 10,000 pounds or less
2. Medium and heavy duty vehicles with a gross vehicle weight of more than 10,000 pounds
3. School buses and transit buses
4. Special use vehicles, such as parking enforcement vehicles and utility carts

Air District incentives for vehicles in category #1 above will be provided through the VIP program described in the next section. Public agencies should request funding for these vehicles from the VIP program, rather than via the TFCA Regional Fund competitive process.

Incentives for vehicles in categories #2 through #4 are available via the TFCA Regional Fund competitive process. The maximum amount for vehicles over 10,000 pounds GVW are:

Eligible Vehicle	Amount Per Vehicle
Transit Buses (30 ft. or bigger)	\$150,000
School Buses (78-84 passenger)	\$ 75,000
All Other Buses	\$ 35,000
Heavy Duty Trucks	\$ 50,000
Street Sweepers	\$ 25,000

The deadline for FY 00/01 TFCA Regional Fund applications is June 30, 2000. To receive a copy of the Application Guidance and Forms, please call the TFCA document request line (415/749-4994), send an e-mail message to tfca@baaqmd.gov, or obtain copies from the Air District's web site at <http://www.baaqmd.gov/planning/plntrns/tfcapage.htm>.

Vehicle Incentive Program (VIP)

The VIP program provides TFCA funds to public agencies for the purchase or lease of alternative fuel (CNG, propane, or electric) passenger cars, pick-up trucks, and vans with a gross vehicle weight of 10,000 pounds or less. Vehicles certified to the California Air Resources Board's ultra low emission vehicles (ULEVs), super low emission vehicles (SULEVs), or zero emission vehicles (ZEVs) standards may apply to receive funding.

In FY 99/00, the VIP program provided a total of \$1.2 million in incentives to help 43 public agencies acquire 196 clean air vehicles: 98 electric vehicles and 98 CNG vehicles. All funds allocated for the FY 99/00 VIP program have been committed.

In June 2000, Air District staff will present a recommended FY 2000/01 VIP program to the District's Board of Directors. Specific VIP incentive amounts and program eligibility will be defined at that time. VIP application forms are scheduled to be mailed out in July 2000, and will

also be posted on the District website at that time. Information on the VIP program is available from David Burch at 415/749-4641 or dburch@baaqmd.gov.

Charge!

The *Charge!* program provides grants to help install a network of publicly-accessible electric vehicle charging stations in the Bay Area. Public and private entities may apply for funding to help offset the cost of purchasing and installing EV chargers. Funding is limited to 40% of the total cost of the chargers, with a maximum funding cap of \$7,000 for a site with one conductive charger and one inductive charger. Applications are currently being accepted and reviewed on an ongoing basis. Application forms and additional information about the *Charge!* program are available on the District website. Questions concerning the *Charge!* program should be addressed to David Burch at 415/749-4641 or dburch@baaqmd.gov.

California Energy Commission's Electric Vehicle Incentive Program

Using funds provided by the California Energy Commission (CEC), the Air District offers financial incentives to private individuals and private fleets for the purchase or lease of qualifying electric vehicles. The incentives are available on a first-come, first-served basis. The incentive is provided to the vehicle manufacturer, reducing the price of a vehicle purchase or lease by \$5,000. The list of vehicles that currently qualify for funding is provided in the "Electric Vehicle" section below. More information on these incentives is available by calling 415/749-5109 or via e-mail at taddison@baaqmd.gov.

Carl Moyer Memorial Air Quality Standards Attainment Program

The purpose of the program is to reduce emissions of oxides of nitrogen (NO_x) from heavy-duty engines by providing grants for the incremental cost of lower-emission engines. Air District's staff anticipates that private companies or public agencies may apply to the Air District for grants in the Fall of 2000.

Printed copies of the Carl Moyer Program Guidelines and application forms are currently available from the CARB Public Information Office, 2020 L Street, Sacramento, 95814, 916/322-2990. Electronic copies are available from CARB's web site, www.arb.ca.gov. For additional assistance, please contact Michael Murphy at 415/749-4644 or mmurphy@baaqmd.gov.

VEHICLES

Electric Vehicles

Original Equipment Manufacturers (OEMs) are now offering electric vehicles for lease or sale. The major vehicle manufacturers have entered into memoranda of agreement (MOA) with the California Air Resources Board (CARB) in which each manufacturer has committed to produce and market a specified number of electric vehicles. The vehicles that qualify for incentives under the VIP and CEC incentive programs described above are listed in Table 1. Electric vehicles are generally offered on a three-year lease basis; only the Solectria Force is available for purchase.

Table 1
Certified Zero Emission Vehicles

Vehicle	Battery Type	Charging System	Available to:
Ford Ranger EV	Lead Acid / NiMH	Conductive	Fleets / Individuals
GM EV1 coupe (2 seat)	NiMH	Inductive	Fleets / Individuals
Chevrolet S-10 pick-up	NiMH	Inductive	Fleets / Individuals (low production volume)
Toyota RAV4 EV	NiMH	Inductive	Fleets
Daimler Chrysler EPIC minivan	NiMH	NA	Fleets
Solectria Force sedan	Lead Acid	Conductive	Fleets / Individuals
Honda EV Plus	NiMH	Conductive	Not currently in production
Nissan Altra EV wagon	Lithium Ion	Inductive	Public utilities only

Source: BAAQMD

Availability of electric vehicles with advanced batteries (Nickel Metal Hydride (NiMH) or lithium ion) is expected to be very limited in year 2000. Most of the vehicle manufacturers have fulfilled their MOA commitments with CARB. Some manufacturers, such as Ford, are expected to offer new EVs that are powered by lead acid batteries. Although lead acid batteries offer less vehicle range, they are well suited for certain applications, including the duty cycles of many public agency fleets. In addition, some used EVs are expected to be available for re-lease.

Public agencies are encouraged to take advantage of the “EV loaner” program administered by the Air Resources Board and the California Department of General Services. Information on the this program is available at www.arb.ca.gov/msprog/zevprog/loanprog/loanprog.htm.

In addition to the full size, general purpose EVs listed in Table 1, there are a variety of smaller special purpose electric vehicles. These vehicles generally offer lower speed and less range, but they may be well suited to specific applications or niche markets such as parking enforcement, campus environments, etc. *Special purpose EVs are not eligible for the VIP or CEC incentive programs, but public agencies may apply for TFCA Regional Funds for such vehicles.*

Both Toyota and Honda are bringing gasoline/electric hybrids – the Toyota Prius and the Honda Insight – to market in year 2000. However, at least for the Honda, production volumes will be limited, and demand is expected to outstrip the available supply.

Table 2 provides contact information for companies and Bay Area dealerships that sell or lease electric vehicles.

Table 2
Light and Medium Duty Electric Vehicle Dealers

Company / Location	Contact	Phone	E-Mail or Website
Ford Alt. Fuels Fleet Sales:	Scott Ruhlen	714/ 939-3580	
Local Ford Ranger EV Dealers: S&C Ford (San Francisco) Mission Valley Ford (San Jose) Lithia Sun Valley Ford (Concord) Hansel Ford (Santa Rosa) Senator Ford (Sacramento)	Frank Ginotti Kyle Fujimoto Joe Gazdowicz Ray Roy	415/ 431-8100 x 329 408/ 933-2375 925/ 686-5000 707/ 543-7300 800/ 245-3673 x 857	
Local Chevrolet S-10 Dealers: Fitzpatrick Chevrolet (Concord)		925/ 689-6500	
Local GM EV1 Marketing Team: Local GM EV1 Dealers: Saturn of Concord (Concord) Saturn Capitol Expressway (San Jose) Saturn of Fremont (Newark) Saturn of Marin (San Rafael) Saturn of San Francisco (Colma)	Amanda Krusoe	510/ 793-8875 925/ 682-6400 408/ 979-5000 510/ 445-8700 415/ 455-1800 650/ 985-5000	EVIAManda@aol.com
Local Honda EV Plus Dealers: San Francisco Honda Stevens Creek Honda (San Jose) Dublin Honda	Mark Barnes Gary Conti Doug Miller	415/ 441-2000 408/ 247-2550 925/ 828-8030	
Toyota Motor Sales USA 19001 South Western Ave. Torrance, CA 90509-2991	Greg Glander	800/GO-TOYOTA or 310/ 618-4139	Greg_glander@toyota.com www.toyota.com/inside_toyota/rav4ev
Solectria Dealers: It's Electric (San Rafael)	Tom Kane	415/ 456-7211	Tom@greenkeys.com www.greenkeys.com
Chrysler Zone Fleet Manager: Chrysler Epic EV Dealers: Serramonte Dodge (Colma) Capitol Dodge (San Jose) Stevens Creek Dodge (San Jose)	Maria Fierro	510/ 460-1757 650/ 991-9300 408/ 448-1000 408/ 248-1800	Maf3@daimlerchrysler.com

Source: BAAQMD

Natural Gas Vehicles

Ford, Honda, Toyota and Chrysler offer model year 2000 ULEV- and SULEV-certified, dedicated natural gas vehicles. Table 3 lists the natural gas vehicles certified to the ULEV or SULEV standards as of the printing of this document. Contact any dealership for purchasing information.

Table 3
Light- and Medium-Duty Natural Gas Vehicles
ULEV and SULEV Certified

Manufacturer	Model	Engine Displacement	Engine Family Number
Ultra Low Emission Vehicle (ULEV)			
Ford	Crown Victoria	4.6 L	YFMXV04.6VP5
Toyota	Camry	2.2 L	YTYXV02.2PPA
Super Ultra Low Emission Vehicle (SULEV)			
Dodge	Ram Pick-up	5.2 L	YCRXT05.26RC
	Ram Van Wagon	5.2 L	YCRXT05.26RC
Ford	F 150 Pick-up	5.4 L	YFMXT05.4RP5
	E250, E350 Van	5.4 L	YFMXT05.4RP6
Honda	Civic GX	1.6 L	YHNXV01.6KA5

Source: CARB

Heavy Duty Vehicles

Unlike light and medium duty vehicles, emissions certification for heavy-duty vehicles is based on the engine only (i.e., it is not vehicle-specific). A heavy duty vehicle may be equipped with one of any number of engines; therefore, the California Air Resources Board certifies engines and not vehicles. Table 4 on the next page provides a list of natural gas and propane engines certified by CARB to the optional low-NO_x standards as of the printing of this document. Updates to this table are available at <http://www.arb.ca.gov/msprog/moyer/certs.htm>.

INFRASTRUCTURE

Electric

There are two primary types of charging technologies available: conductive and inductive. Conductive charging uses the plug concept of metal-to-metal contact to transfer electricity to the vehicle's battery pack. Ford, Honda, and Solectria use conductive charging. Inductive charging transfers electricity through a magnetic coupler. GM, Toyota, and Nissan use inductive charging systems in their EVs. Table 5 on the next page lists companies that sell electric vehicle recharging equipment.

In California, Sacramento Municipal Utility District is the exclusive distributor of inductive GM "Magnecharger" equipment and Toyota "Gen 3" chargers. Clean Fuel Connection works as a subcontractor to SMUD and can provide a full range of services (e.g. arranging for cost estimates, consultations, grant-writing, etc.). Funding assistance for the purchase of publicly accessible chargers is available through the Air District's *Charge!* program. In addition, site owners may be eligible for limited federal tax deductions for costs related to installation of EV charging sites.

Table 4
Heavy Duty Natural Gas and Propane Engines

MY	Manuf.	Service Type ^a	Fuel Type	Displ (ltr)	Cert. Std. NOx/PM	HP
2000	Baytech	MHD	Dual ^b	5.7	1.5/NA	211/245
2000	Baytech	MHD	CNG	5.7	1.5/NA	211
2000	Mack	UB/HHD	L/CNG	11.9	2.5/0.05	325/350
2000	IMPCO	MHD	LPG	7.4	1.5/NA	229
1999	Deere	MHD	CNG	6.8	2.5/0.10	225
1999	Deere	MHD	CNG	8.1	2.5/0.10	250
1999	DDC	UB/HHD	CNG	12.7	2.5/0.05	330
1999	DDC	UB/HHD	CNG	8.5	2.5/0.05	275
1999	Cummins	UB/HHD	L/CNG	10.0	2.0/0.05	280/300
1999	Cummins	MHD	L/CNG	8.3	2.5/0.10	250/275
1999	Cummins	UB/HHD	L/CNG	8.3	2.5/0.05	250/275
1999	Cummins	MHD	L/CNG	5.9	2.5/0.10	150/195/230
1999	Cummins	MHD	LPG	5.9	2.5/0.10	195
1999	IMPCO	MHD	LPG	7.4	1.5/NA	229
1998	Cummins	MHD	L/CNG	5.9	2.5/0.10	150/195/230
1998	Cummins	MHD	LPG	5.9	2.5/0.10	195
1998	Cummins	UB	L/CNG	8.3	2.5/0.05	250/275
1998	Cummins	HHD	L/CNG	8.3	2.5/0.10	250/275
1998	Cummins	UB	L/CNG	10.0	2.0/0.05	280/300
1998	Cummins	HHD	L/CNG	10.0	2.0/0.10	280/300
1998	DDC	UB	CNG	8.5	2.5/0.05	275
1998	PSA ^c	HHD	Dual ^d	10.3	2.5/0.10	305/350
1998	PSA	HHD	Dual	12.0	2.5/0.10	370/410

^aService Type: MHD (Medium Heavy-Duty); HHD (Heavy Heavy-Duty); UB (Urban Bus)

^b Dual fuel (CNG + gasoline) ^cPower Systems Associates (using Caterpillar engines) ^dDual Fuel (CNG + Diesel; or LNG + Diesel)

Source: CARB

Table 5
Electric Vehicle Infrastructure Companies

Company	Service	Contact	Phone Number	E-Mail
SMUD	Equipment & Installation	Patrick Kennedy	916/ 732-6578	Pkenned@SMUD.org
Clean Fuel Connection	Equipment & Installation	Enid Joffe	626/ 440-8812	Enidjoffe@cleanfuelconnection.com
EVI	Conductive chargers	Jason France	530/ 823-8077	
SCI Systems	Conductive chargers	Danny Bodkin	205/ 882-4818	
AVCON	Conductive chargers		800/ 433-642	
Lockheed Martin	Conductive chargers		800/ 576-3346 607/ 770-3908	

Source: BAAQMD

Natural Gas

Companies interested in building and operating natural gas fueling stations in the Bay Area are listed in Table 6. Many of these companies are willing to construct and operate a compressed natural gas refueling station in exchange for a guaranteed level of fuel sales over a given period of time. The list in Table 6 was developed by PG&E. It is not all inclusive and is not intended as an endorsement from PG&E or the Air District

**Table 6
Natural Gas Vehicle Infrastructure Companies**

COMPANY and ADDRESS	CONTACT	PHONE
Bauer Compressors, Inc. 1328 Azalea Garden Road Norfolk, VA 23502	Merv Bohrer	804/ 855-6006
Fuelmaker, Inc. 4505 Deerhorn Court Antioch, CA 94509	Paula Hebert	800/ 898-3835 510/ 706-7633
Hurricane Compressors 1015 N. Hurricane Road Franklin, IN 46131	Eric Massinon	800/ 754-7408
IMW Atlas 23411 Summerfield, Ste. 35G Aliso Viejo, CA 92656	Dave Postuma	619/ 940-8605
Kraus Alternate Fuels 25 Paquin Road Winnipeg, MB Canada	Willie Romero	204/ 988-1234
Natural Fuels 501 First Street, Suite 115 San Francisco, CA 94107	Kimberly Myers	415/ 543-5654
Pickens Fuel Corporation 3030 Old Ranch Parkway, Suite 280 Seal Beach, CA 90740	Gordon Lilley	562/ 493-2804 x230
Pinnacle CNG Systems, LLC 300 N. Marienfeld, Suite 950 Midland, TX 79702	Drew Diggins	915/ 686-7002
Raymundo Engineering P.O. Box 30425 Walnut Creek, CA 94598	Bill Raymundo	510/ 988-0172
Sahara/Avatar 4332 Fruitvale Avenue Oakland, CA 94602	Bernard Banash	510/ 531-7991
Sulzer USA 10213 E. Caron Street Scottsdale, AZ 85258	Hank McElvery	602/ 391-0912
Trillium USA 699 East South Temple, Suite 200 Salt Lake City, UT 84102	Jan Hull	800/ 920-1166
Wilson Technologies 12118 South Bloomfield Santa Fe Springs, CA 90670	Jim Caponigro	310/ 929-6789